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RECORD OF ORAL HEARING

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVOR PROTIC and THOMAS KRINGS

Appeal 2009-012467
Application 10/511,734
Technology Center 2800

Oral Hearing Held: June 23, 2010

Before ROBERT E. NAPPI, JOHN C. MARTIN, JOSEPH F. RUGGIERO, Administrative Patent Judges.

ON BEHALF OF THE APPELLANT:

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The above-entitled matter came on for hearing on Tuesday, June 23, 2010, commencing at 9:58 a.m., at the U.S. Patent and Trademark Office, 600 Dulany Street, 9th Floor, Alexandria, Virginia, before Lori Beth Allen, Notary Public.

JUDGE NAPPI: Good morning, Mr. McHenry.

MR. MCHENRY: Good morning.

JUDGE NAPPI: You have 20 minutes. But before you start, can you give the stenographer a copy of your business card, so she gets the spelling of your name proper on the record?

And also so she can contact you in case there's any questions?

MR. MCHENRY: Actually, I don't think I have a copy, or I have a business card, to tell you the truth.

JUDGE NAPPI: Can you just spell your name for the record?

MR. MCHENRY: Sure. Thank you. K-e-v-i-n and my last name, M-c-H-e-n-r-y.

JUDGE NAPPI: You may begin.

MR. MCHENRY: Okay.

Well, thank you for your time today. I'd like to begin by actually just addressing the Examiner's rejection, and in the Examiner's rejection, the Examiner relies heavily on equivalents.

The Examiner argues that the secondary reference in the obviousness rejection Luke teaches equivalence for amorphous germanium contacts, and what I'll call doped contacts, contacts formed by doping elements such as lithium, boron, phosphorus, elements of that nature, and saying that it would just simply be obvious to substitute the doped contact of

the base reference by the amorphous germanium contact of the secondary reference loop, simply because they're equivalent.

And my point is that in reaching this conclusion of obviousness, using this rationale of equivalence, the Examiner has not properly considered the facts and evidence before him, and particularly the references and the knowledge that one of ordinary skill in the art, and that there is no equivalence, there is no teaching of equivalence for these two features.

And first of all, the Applicant's own specification shows that amorphous germanium contacts have lower energy resolution than, say, the dope contacts, and that they would function differently and provide different results.

JUDGE MARTIN: Mr. McHenry, that part of the spec you're talking about, are you referring to page 5, that first paragraph, that says, "Comparatively poor resolution has been achieved"?

MR. MCHENRY: Yes.

JUDGE MARTIN: So we don't have any data? We don't know how much work the energy resolution is? Just that statement?

MR. MCHENRY: That's correct.

JUDGE MARTIN: All right.

MR. MCHENRY: That's correct.

Further, the Declaration provided by Mr. Protic, the final paragraph on page 2, where he spoke of the test, where the test showed that using amorphous germanium contacts provided lower energy resolution, that also shows that there is not equivalence between these doped contacts and the amorphous germanium contacts, and that you the lower energy resolution, though, than you would normally expect from the doped contacts

And also Luke itself just simply does not provide the teaching of equivalence. Luke -- I'll turn to that, my copy -- Luke itself on the second page, which is page 591, there is a Figure 3, and -- I'm sorry, the first full paragraph on the second column on page 591, that last sentence, it talks about that amorphous germanium contacts that were used and tested, and says that the amorphous N-plus device showed a much higher leakage current than amorphous P-P-plus and conventional devices.

You know, you would actually have different results than we'd see than with the conventional device.

So although Luke itself-- and as the Examiner pointed out in essentially the next paragraph there, in the second column of page 591, the first sentence -- it says that "amorphous germanium contacts can replace the other contacts of the detector," it's saying that they're different.

It's not saying they're equivalent. It's saying that they're different. They have different function -- or I'm sorry, different performance, different results. And it's not a simple matter of just replacing one with another.

And so the Examiner cannot rely on a rationale of equivalence in obtaining that conclusion of obviousness.

And if you really studied these facts and evidence that would underlie such a conclusion of obviousness, one wouldn't find support for a rationale or equivalence.

JUDGE RUGGIERO: I have a question about your interpretation of Figure 3 here.

MR. MCHENRY: Yes. Mm-hmm.

JUDGE RUGGIERO: It seems like in your writings in the Reply Brief, you're referring to the graph line on the far right.

MR. MCHENRY: Yes.

JUDGE RUGGIERO: But that is not -- the A-N and N-plus, that's not the replacement of boron. Boron is P.

So when you replace boron with amorphous germanium, you have a P, which is the line on the far left.

MR. MCHENRY: Right.

JUDGE RUGGIERO: It seems like it.

MR. MCHENRY: Well, excuse me. Are you saying, though, that --

JUDGE RUGGIERO: It just seems that you were focusing attention on the far right.

MR. MCHENRY: Right.

JUDGE RUGGIERO: But that is not the replacement of boron with amorphous germanium. It's the replacement of an N material with amorphous germanium.

MR. MCHENRY: Right.

JUDGE RUGGIERO: The Examiner is replacing boron with amorphous germanium. That would the line on the left.

MR. MCHENRY: Now, now -- I'm sorry, the N materials, they would include -- and correct me if I'm wrong -- lithium or phosphorus?

JUDGE RUGGIERO: Well, phosphorus is N. Right?

MR. MCHENRY: Right.

JUDGE RUGGIERO: And boron is P.

MR. MCHENRY: Right.

JUDGE RUGGIERO: So.

MR. MCHENRY: And actually --

JUDGE RUGGIERO: The Examiner's position is amorphous germanium is an alternative replacement for boron.

MR. MCHENRY: Boron being --

JUDGE RUGGIERO: That's what you might get out of the Examiner's position.

MR. MCHENRY: Boron being a positive material?

JUDGE RUGGIERO: Well, the first full paragraph on page 490 of Luke talks about various types of contacts --

MR. MCHENRY: Mm-hmm --

JUDGE MARTIN: Lithium, boron, and I guess phosphorous he talks about in there also.

The very beginning of the next paragraph, he says, "An alternative to the contacts discussed above are amorphous contacts."

MR. MCHENRY: Mm-hmm.

JUDGE MARTIN: So I think the Examiner's -- let's see what I can find here -- yeah, I think the bottom of page 8 of the answer says, "Luke teaches to suggest that blocking contacts are selected from one of the following equivalent blocking contacts: Boron, amorphous silicon, or amorphous germanium."

So it seems like he's considering amorphous contacts as equivalent to boron.

MR. MCHENRY: Yeah. I understand what you're saying.

I would rely on my previous statements that I said about the change in energy resolution, that one of ordinary skill in the art would understand there'd be a difference in energy resolution.

I'd also point out that Luke itself on the first full paragraph on the second column of 590, Luke even talks about in the final sentence of that paragraph, "preliminary results show that sputtered amorphous germanium contacts can be used as blocking contacts on germanium radiation detectors, with potential advantages over conventional contacts."

And also in the, sorry, the previous paragraph, at the bottom of the first column, on page 590 of Luke, there's a sentence saying, "Amorphous germanium blocking contacts on high purity germanium detectors were investigated in 1977, but the devices showed large variations in leakage currents."

JUDGE RUGGIERO: But doesn't the next sentence specifically say that is referring to amorphous germanium that was deposited by vacuum evaporations?

MR. MCHENRY: Yes, it does.

JUDGE RUGGIERO: And then it goes on to say that there are other techniques used: Chemical vapor deposition. And then this paper talks about sputtering techniques.

So, I mean, do those comments about the large variations of leakage currents, we're supposed to understand it to apply to all those different techniques?

MR. MCHENRY: No.

I think that it's just part of the overall context of this reference and whether it's teaching equivalence; and that I think that it's, you know, showing that in the past there is an understanding that they are different.

And then the next paragraph showing that there's a difference in that there's possible advantages, and along with other knowledge from the declaration that was submitted, statement in the specification that there's a difference in energy resolution, that again the Examiner is relying on equivalence.

But, you know, the facts that see in this reference, knowledge of one of ordinary skill in the art, is that that rationale, that conclusion of equivalence, is just not supported by the underlying facts.

And then my next point is that in terms of what the art would actually indicate, what it would disclose and suggest to one of ordinary skill in the art is not a combination, say of the base reference in Luke that would provide structure with contacts going through amorphous germanium, all the way through to the underlying semiconductor material.

The base reference itself, Hamacher, it shows in its figure, that it really provides a kind of a thin disclosure, it just shows that you provide the contacts that you can -- and these are the doped type of contacts, of course -- and that you provide the structure all the way down to the semi-conductor material.

But it doesn't explain why, or you know, the rationale for doing so.

Now Luke, when it's discussing the amorphous germanium contacts, it does speak of how it is desirable to -- or an advantage actually of the amorphous germanium contacts is that not only do they provide the

contact material, but they also provide passivation material, and that there's material between the contacts on top of the semi-conductor material, so that there is no cutting down or etching or exposure into the semiconductor material.

And as discussed in the brief, the Amman article also discussed this, and said that this is an advantage, because over in the doped contacts, the conventional-type contacts, that once they are made, you actually, it's desirable to have a passivation.

In fact, it says that you should have a passivation step to ensure long-term stability of the contact. And the advantage of having the amorphous germanium contact is that knowledge you provide a germanium contact when you deposit it, but you also provide a passivation layer.

My point being is that one of ordinary skill in the art, when considering these facts, you know, these teachings, would understand that one wouldn't want to provide the structures of the contacts through the amorphous germanium contact into the underlying semiconductor material; because Luke actually teaches that you want to have it present, you want to have a passivation layer.

You want to provide that protection and that long-term stability.

So when considering these teachings, you wouldn't simply -- I think as the Examiner is arguing -- try to insert an amorphous germanium contact, or substitute for a doped contact, and leave an unpassivated layer in between. You would actually want that amorphous layer in between for its protection.

And also the Amman article says that you reduce the processing steps and make the fabrication simpler.

And so, to sum that up, that again reference is the knowledge of one of ordinary skill in the art doesn't support a conclusion of equivalence.

And with that removed, I think one of ordinary skill in the art would have to consider the facts before them, and how they are used to develop a rationale, how they arrive at the conclusion of obviousness to combine the base reference in Luke to provide the features of Claim 1.

And looking at the actual reference as what they teach, they don't support such a conclusion. As I said, Luke teaches that the passivation layer is desired. And that's also supported in the Amman article.

JUDGE NAPPI: Does the primary reference have a passivation layer?

MR. MCHENRY: No. I did not see one. It shows in the figure on the first page that to develop from the semiconductor, you build up the layers and you etch them. And then after that I believe the discussion gets into the performance.

But it does not discuss passivation, or even why you have the etching or cutting through the dope layer into the --

JUDGE NAPPI: So wasn't Luke just saying if we used this amorphous silicone, you can also get a passivation layer?

MR. MCHENRY: Amorphous silicone --

JUDGE NAPPI: Why -- I'm sorry?

(Discussion was held off the record.)

JUDGE NAPPI: I'm sorry --

MR. MCHENRY: Okay --

JUDGE NAPPI: Amorphous germanium.

When you put Luke, isn't it just saying that's an advantage of using the amorphous germanium, is that it gives you passivation? Why is it saying it's necessary, given the fact that the primary reference doesn't teach that it's necessary?

MR. MCHENRY: I think, well, actually I'll answer that by referring back to the Amman article that was provided as Supplemental Response submitted January 31st. It is also attached to the Appeal Brief. Sorry --

JUDGE NAPPI: Mm-hmm. We have it.

MR. MCHENRY: So on page 887, which is the second page of the Amman reference, the very first paragraph, top of the first column, it's discussing doped type contacts. And you know, such as the P contacts, the N contacts. And then the first full paragraph on that first column.

JUDGE NAPPI: That starts off, "To produce"?

MR. MCHENRY: Yes, exactly.

JUDGE NAPPI: Okay.

MR. MCHENRY: Later in that paragraph, there's a sentence starting off, "Furthermore." It says, "Furthermore, the inter-contacted surfaces of both contact types" -- and again, this is referring to the doped-type contacts -- "should be passivated to obtain long-term detector stability, thereby necessitating additional processing steps," again, providing contacts that when you add doped-type contacts is advantageous, in fact saying they should be passivated to obtain long-term detector stability. And another advantage is that it simplifies the process.

JUDGE MARTIN: Isn't the date of that article 2007, well after your filing date?

MR. MCHENRY: Yes, it is.

JUDGE MARTIN: Thank you.

Another question. Does the Applicant require passivation in its device? Is it disclosed as requiring passivation?

MR. MCHENRY: We'll quickly refer to Claim 1, I want to say, no, that it's not the feature that is recited in Claim 1.

JUDGE MARTIN: Okay. So it's not just described as required in the application, so far as you can recall?

MR. MCHENRY: No.

JUDGE MARTIN: Okay.

Have the Applicants discovered that you don't need a passivation layer all the time?

MR. MCHENRY: You know, referring to the Declaration and again, the disclosure of the application -- and I think you say is that's the advantage of the invention -- is that there was this thinking and knowledge that amorphous germanium layers actually could reduce energy resolution when they are provided, even though they are serving as passivation layer in between the contacts.

And the inventors here discovered that if you use the amorphous germanium contacts and you etch them, remove them, the amorphous germanium contacts, down to the underlying semiconductor material, that you actually could see improved performance, such as energy resolution.

JUDGE MARTIN: Is energy resolution a function of leakage current? I thought I saw --

MR. MCHENRY: I believe that was discussed in the Declaration by Mr. Protic.

JUDGE MARTIN: Okay. And Declaration also says that, in paragraph 10, that the typical operating temperature of detector made of germanium is 77 degrees Kelvin, and constantly low. As a result, the leakage current is low.

So it doesn't sound like leakage current's a problem at that expected operating temperature. So I wouldn't expect, or think you wouldn't expect -- I'm sorry, what's the other concept we were looking for -- sensitivity? Was that it?

Oh, I'm sorry, energy resolution. They would expect that to be poor if the dark current is not a problem at the expected operating temperature.

MR. MCHENRY: I understand.

I think to answer your question, I would refer to the Appeal Brief, pages 6 to 7, which in turn refers to the page 889 of the Amman publication, which is talking about also cycling of the temperatures for these devices, and that the temperature cycling can lead to increased leakage currents, which can then lead to a degradation of energy resolution.

So it's perhaps a single operating temperature is a factor for leakage current, but also what you see with the temperature cycling can lead to increased leakage currents and degradation performance.

Are there any other questions?

JUDGE RUGGIERO: No.

JUDGE NAPPI: Thank you very much for your time.

MR. MCHENRY: Thank you.

Whereupon, at 10:19 a. m. the hearing was concluded.